Seroprevalence of Brucellosis in western Rajasthan

Sabir Ali[1], Gopal Krishana Bohra[*2], Dinesh Kothari[3], Deepak Kumar[4], Twinkle Vyas[5]

[1] Assistant Professor, Department of Medicine, Dr. S.N. Medical College, Jodhpur, Rajasthan, India

[2] Assistant Professor, Department of Medicine, Dr. S.N. Medical College, Jodhpur, Rajasthan, India

[3] Ex. Professor & Head, Department of Medicine, Dr. S.N. Medical College, Jodhpur, Rajasthan, India

[4] Senior Resident, Department of Medicine, Dr. S.N. Medical College, Jodhpur, Rajasthan, India

[5] Medical Officer, Government of Rajasthan, India

Email: drsabirali11@gmail.com, gopalbohra17@gmail.com, drkothari23@gmail.com, deepak1007sharma@gmail.com,

twinkle.bohra21@gmail.com

ABSTRACT

Brucellosis is the most common zoonotic disease in the world and also an important zoonotic problem in western India, which also accounts economic losses of about Rs 350 million per year and is endemic throughout the country[1]. The exact magnitude of this problem is not known because of paucity of reports.

The present study was conducted on 350 persons with risk factors for Brucellosis and 100 controls were screened with ELISA (Enzyme linked immunosorbent assay) and SFA (Stained febrile antigen test) for seroprevalence and complete clinical history, and history of exposure to milk, meat and animals was elucidated. Significant results were observed in group with meat handlers and milkman and Veterinarian. In this study, it has been observed that 28 (28%) milkmen and veterinarians, 21(42%) meat handlers, 26(13%) cases of PUO (Pyrexia of unknown origin) and 4(4%) normal healthy control were positive for Brucella IgG antibody. Thus, Brucellosis needs to be considered as an important differential diagnosis in patients with PUO and awareness of risk groups is needed to take appropriate preventive measures and to accept control measures.

Keywords- *Brucellosis, meat-handler, seroprevalence, PUO, veterinarians*

1. INTRODUCTION

Brucellosis is a zoonotic disease transmitted from animals to men. It is the most common zoonosis in the world, accounting for annual occurrence of more then 5, 00,000 cases.[2] Persons in close contact of infected animals are at risk to develop Brucellosis . According to various studies, the most common method of

transmission is through animal contact and consumption of unpasteurized dairy products. In many endemic areas, the unpasteurized goat's milk is a major source of infection[3]. Ingestion of raw or partly cooked meat is another source of infection. In occupationally related cases, transmission through skin abrasions and cuts is probably the most common method. Aerosol transmission is another method of transmission of the disease. Milkmen, shepherds who raise large number of animals in herds, abattoirs and butchers working in slaughter houses, veterinarians and laboratory workers who are exposed to infected animals and their products are at increased risk of transmission. Infection by inhalation is a serious risk in laboratory workers handling Brucella, but man to man transmission does not seems to occur.

Incidence of Brucellosis is markedly less reported from this region inspite of the fact that all the favourable conditions mentioned above are existing, the probable reason for this is that most of the clinicians do not consider Brucellosis as a cause of prolonged pyrexia and recurrent arthralgia[.3]

Almost all other tropical diseases e.g. malaria, enteric fever, meningitis, heat stroke etc are also common in Western Rajasthan, but in literature there are very few reports of Brucellosis cited. The most probable reason for this is that the physician does not think over it when a person or patient with complaints of joints pain with or without history of pyrexia of unknown origin come to them. Second reason is that the disease is much more prevalent in peripheral rural areas, where there is lack of awareness among people about their own health.

2. METHODOLOGY

This study was conducted in a tertiary care centre in western Rajasthan. A total of 450 persons were subjected to ELISA and SFA test for detecting the status or seroprevalence of Brucella antibody in human beings. Although, the definite diagnosis of Brucellosis requires the isolation of the organism from blood or other body fluids, since Brucella are slow growing organisms and require special culture conditions owing to the delay in the isolation, serological methods are required for a rapid diagnosis. The antibodies detected by serological testing are directed against the lipopolysaccharide of the bacterial cell wall[4]. Plasmatec stained antigen suspensions are used for the identification and quantitative determination of specific antibodies in human sera following infection with certain Salmonellae, Rickettsia and Brucella pathogens.[4]

Out of 450 subjects, 100 were taken as healthy controls, most of them were medical students and nursing staff. In second group, 100 persons were included who were engaged in milking and the veterinarians, this includes both Doctors and Para veterinarians staff of veterinary hospital of Jodhpur district.

Third group included a total 50 persons who were meat handlers and also having history of animal contact. They were mainly engaged in these activities for livelihood.

Fourth group included 200 cases, which were having pyrexia of unknown origin. The commonly prevalent endemic diseases were screened using widal test, malarial antigen, chest radiographs and viral serology for

hepatitis along with other routine investigations. Specifically tuberculosis was ruled out by taking specific history of patient particularly sign and symptom and history of long duration therapy, if any.

Each patient is subjected to detailed history, clinical examination with special emphasis on symptoms like Fever, Joint pain, Low backache, Cough-flu like symptoms and signs like Hepatospeleenomegaly, Lymphadenopathy, & routine investigations like haemoglobin, complete blood count, blood film for malaria and antigen test, Serology for Brucella, CRP, RA, HIV.

Particular emphasis was given to cases with history of direct or indirect contact with animal, raw meat and history of raw milk ingestion.

Finally, all the four groups were summarized according to their history of consumption of raw milk, animal handling, occupation and status of anti Brucella IgG antibody and stained febrile antigen in their blood.

3. OBSERVATIONS:

This study was conducted in a tertiary care centre in western Rajasthan. A total of 450 persons were subjected to ELISA and SFA test for detecting the seroprevalence of Brucella antibody in human beings.

Distribution of subject based on contact with Animals and Raw Milks Consumption has been illustrated in table no.1.

As shown in table 1 the history of raw milk consumption is much higher in persons with PUO (12%) as compared to normal healthy subject (5%). In this study, out of total 450 subjects, 96 were having history of raw milk consumptions. History of Raw Milk Consumption is much higher in Milkmen & Veterinarian (54%) and Meat handler(26%).

Table No. 1

Distribution of Subject Based on Contact with Animals and Raw Milk Consumption

Name of group	No. of subjects	History of Contact with animals		History of Raw Milk Consumption	
		Total	%	Total	%
Normal healthy control	100	18	18	5	5

Meat handlers	50	50	100	13	26
Milkmen & Veterinarian	100	100	100	54	54
PUO case	200	40	20	24	12
Total	450	208		96	

Table No. II

Brucella IgG Status amongst **Total subjects (n=450)**

Name of Group	Cases No.	Brucella					
		Positive		Grey Zone		Negative	
		Number	%	Number	%	Number	%
Normal healthy control	100	4	4	2	2	94	94
Meat handlers	50	21	42	7	14	22	44
Milkmen & Veterinarian	100	28	28	4	4	68	68
PUO case	200	26	13	13	6.5	161	80.5
Total	450	79	17.55	26	5.77	345	76.66

Table 2 shows Brucella IgG Status in all subjects.

Persons with Brucella IgG more than 11 NU were considered positive, those between 9 and 11 NU in grey zone and less than 9 NU as negative. Normal healthy control population had 4 %(4) positivity for anti Brucella IgG, 2% in Grey zone and rest 94 %(94) were negative. Amongst the milkmen and veterinarians positivity rate was 28 %(28), in 68 %(68) immunoglobulin level were less than 9 NU and rest 4% were in Grey zone. In meat handlers 21(42%) individuals were positive, 7(14%) were in Grey zone and rest 22(44%) persons were negative for it. Only 13% PUO cases showed positive IgG level, 6.5% were in grey zone and rest 161 were negative for Brucella IgG. The overall spectrum shows that 17.55 % persons were having

positive Brucella IgG level, 5.77% were in grey zone and rest 76.66% were found to be negative for Brucella IgG in their blood.

Table No 3

SFA Status amongst total study groups (n=450)

Study Groups	Cases No.	SFA Result			
		Positive		Negative	
		No.	%	No.	%
Normal Healthy Control	100	6	6	94	94
Milkmen & Veterinarians	100	32	32	68	68
Meat Handlers	50	28	56	22	44
PUO Cases	200	39	19.5	161	80.5
Total	**450**	**105**		**345**	

Table No.3 illustrates SFA status in overall study group. SFA test was positive in 32% of milkmen & veterinarians 56 % of meat handlers, 19.5 % of PUO cases and 6% of normal healthy controls.

4. Discussion

Brucellosis is a zoonotic disease transmitted indirectly or directly from animals to human beings. This disease is also known as undulant fever due to nature of disease. Persons who are in close contact of infected animals as most likely to develop the disease. According to previous studies, the most common route of transmission is through animal contact and consumption of unpasteurized dairy products mainly soft cheese, milk and ice creams. Ingestion of raw or partly cooked meat is another source of infection.

Incidence of Brucellosis is underreported from this region, despite of the fact that all risk factors for Brucellosis are very well seen here. Reason for this being that, Brucella is hardly kept under differential diagnosis of prolonged pyrexia and recurrent arthralgia by clinicians and cases are largely under reported.

A strong co-relation between consumption of raw milk, handling of animals and animal products, rearing of cows, goats, sheep, camels and raised titre of Brucella antibody has been observed.

In this study, the contact with animals particularly goats and camel, was found to be most common cause for disease transmission. Both Brucella IgG antibody and SFA test were positive in significantly higher number of milkmen and veterinarians(28%and32% respectively) and meat handlers (42% and 56% respectively) as compared to control population(4% and6% respectively). This supports the point that prolonged contact with animals is one of the most important risk factor for disease transmission particularly in milkmen, veterinarians and meat handlers.

Although person to person, aerosol transmission of Brucellosis has been reported but it is very rare and can be considered only in the situation when other risk factors do not exist[5, 6]. In this study, the other risk factors were also noted therefore these modes of transmission cannot be commented upon.

The rate of seropositivity in healthy subjects was 4%, showing the subclinical existence of disease in this part of Western Rajasthan.

In cases with PUO, Brucella IgG and SFA were positive in 26(13%) and 39(19.5%) cases respectively which is significantly higher than that in control population (4% and6% respectively). Previous reports from other centres from India have reported seroprevalence ranging from 0.8 to 6.8% in patients with PUO [7.] This calls for an increased awareness among clinicians for keeping Brucellosis in differential diagnosis of PUO.

5. Conclusion

The present study clearly shows that Brucella is widely prevalent and often under diagnosed health problem in western Rajasthan especially in those with history of contact with animals, raw milk consumption and those handling raw meat. This group needs to be routinely screened for Brucella infection and require protective measures. Animals also require a routine screening for Brucella infection and treatment for the same.

Further, such studies should be regularly conducted to know the prevalence of Brucellosis in populations, which are most susceptible to this zoonosis.

6. REFERENCES

[1]   National Control Programme on Brucella PD_ADMS/ *Tech.bull*/15/2012

[2]   Pappas G, Papadimitriou P, akritidis N, Christou L and Tsianos E V2006The new global map of human brucellosis; Lancet. Infect.Dis. 6, 91–99

[3]   Pappas G, AkritidisN, Mile Bosilkovski M and Tsianos E, N Engl J Med 2005; 352:2325-2336June 2, 2005DOI: 10.1056/

[4]   Diaz, R., and I. Moriyón. 1989. Laboratory techniques in the diagnosis of human brucellosis, p. 73-83. In E. J. Young and M. J. Corbel (ed.). Brucellosis: clinical and laboratory aspects. CRC Press, Inc., Boca Raton, FL

[5]   Bruce R, Jefery DB, Pluto W, James C, Person to person transmission of Brucella melitiensis. A short report. The lancet 1991; 337: 14-15

[6]   Christopher W, Cooper, Risk factors in transmission of brucellosis from animals to humans in Saudi Arabia, Transactions of the Royal Society of Trop Medicine and Hygiene 1992; 86:206-209.

[7]   Mantur B G, Biradar M S, Bidri R C, Mulimani M S,   Veerappa,Kariholu P, Patil S B and Mangalgi S S 2006 Protean clinical manifestations and diagnostic challenges   of human brucellosis in adults: 16 years' experience in an endemic area; J. Med.Microbiol. 55 897–903